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# The Clinical Aspects of Botulism

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Botulism belongs to a number of infections which have been almost completely liquidated in our country. However, even at the present time individual cases of this disease are encountered. Thus, from 1953 through 1961, 8 persons afflicted with botulism were hospitalized inclusively in the 7th Moscow Clinical Infectious Hospital. While undergoing treatment in this clinic, the patients were of a definite interest in respect to the peculiarities of the course of botulism, its epidemiology and treatment.

This writing was undertaken with the aim of describing the peculiarities observed by us. In addition to this, we consider that it is necessary to once more remind physicians about this disease, because practice shows that they frequently forget about it and this results in an untimely diagnosis.

Out of the 8 patients that came under our observation, 5 were men and 3 were women. All of them were young, only one patient was over 30 years of age. There were no accompanying serious diseases noted in any of them; one patient had a heart defect but it was in a stage of complete compensation.

In 6 patients we decided on the diagnosis of botulism on the basis of a typical clinical picture, and in the remaining 2, in addition to that, it was supported by the isolation of the botulism toxin from the patients' blood.

Three patients were admitted to the infirmary on the 2nd day of illness, one on the 3rd day, one on the 4th day, two on the 6th day and one patient on the 22nd day of illness. The late admission of some patients (on the 6th and

22nd day of illness) is explained not only by the difficulty in the diagnosis of botulism, but also by the inadequate familiarity with this infection on the part of physicians in the polyclinic system. For example, a typical clinical picture of botulism was observed in patient I. who was admitted on the 22nd day of illness. Besides this, 3 members of her family were infected along with her. They had eaten a ham that was domestically prepared. But in spite of the group nature of the disease, a correct diagnosis was not made for any of them and specific (serumal) treatment was not carried out.

An incorrect diagnosis was made in another case of disease which was also of a group nature. Five young people became ill after eating Caspian sardelle in tomato. Three of them were in our hospital for treatment, while the first two who were hospitalized were assigned with a diagnosis of diphtheria.

It is interesting that while within each of these two groups of stricken people, the clinical picture of botulism was characterized by a very close symptomatology, at the same time between groups of patients who were infected following the use of different food products, clinical differences existed. Thus, in persons who were stricken after eating sardelle, bulbar disorders (difficulty in swallowing and respiration, disarthria, and others) appeard first and foremost. In the other group of patients, who were contaminated from infected ham, there were no profound bulbar affections; they were bothered with dryness in the mouth, impaired vision, constipation, and general weakness. Back in 1937, N.V. Mirtovskiy and N.A. Govseyev turned their attention to this fact. As K.I. Matveyev points out (1959), the reason for a certain manifestation remains unclear and cannot be explained by the action of various types of Cl. botulinum.

The progress of the clinical symptomatology in our patients was no different in basic respects from that which has been described in literature. The onset of the illness was acute in all patients. The characteristic neurological changes

(difficulty in swallowing, worsening of vision, diplopia, vertigo) were already noted in one patient on the first day of illness. Neurological disorders showed up in 3 patients on the 2nd day of illness, and by the 4 day they had appeared in all the patients. Further aggravation of neurologic symptoms continued up to the 5th day of illness. During the period of max development of the disease, there were headaches in of the 8 persons b examined, vertigo in 2, difficulty in breathing in 2, red swallowing in ech disorders in 7 patients, limited mobility of soft palate in 4, absence of or reduction of pharyngeal reflex in 5, scleral injection in 4, limited movement of the eyeballs to the sides in 3, mydriasis in 3, ptosis in 6, nystagmus in 4, anisocoria in 2, diplopia in 3, weakness of convergence in 3, worsening of vision in 2, deviation of the tongue in 2, light paresis of the facial nerves in 5, and difficulty during urination in one patient. In patient I. the impairment to swallowing was so sharply expressed that there was suspicion of an obstruction in the esophagus and as a result he was directed to the surgical ward where they made an esophagoscope and two roentgenoscopes of the stomach.

Patient I., 23 years old, was admitted to the clinic for infectious diseases of the I.M. Sechenov 1st Moscow Medical Institute on 11/X 1958 in the 6th day of illness. From anamnesis it was clarified that on 5/X around noon the patient used canned fish as food. During the evening of the same day the patient sensed a dryness in the mouth and a feeling of "awkwardness" when swallowing. On the morning of 6/X the patient was bothered with a headache, vertigo, and dryness in the mouth; the patient couldn't read; the "letters started running" ( a result of diplopia). Swallowing of both solid food and water became impossible, the water ran out through the nose. These symptoms progressed. The relatives, who had become anxious by this, called a doctor who hospitalized the patient in the surgical ward of the 1st Municipal Hospital on 8/X with the diagnosis - acute obstruction of the esophagus.

In the hospital, no mechanical obstructions were revealed by esophagoscopy and x-ray examination, but a persistent spasm of the esophagus was established in a limited area below the pyriform sinuses. Then the patient was transferred to the poliomyelitis ward, however a thorough examination didn't reveal the symptoms of poliomyelitis and finally the patient was admitted to our clinic with a diagnosis of a bulbar form of botulism.

Upon admission there was an expressed difficulty in swallowing, dryness in the mouth, a distillation of objects, flickering of "flies", and a sensation of "netting" in front of the eyes. The temperature increased up to 38,5 - 38.8° during the first two days, then a subfebrile condition was observed; consciousness remained clear, speech was difficult.

There was pupil dilatation with a non-uniformity of their widths (on the left the pupil was wider - anisocoria), convergence was disturbed, and there was ptosis of the upper left eyelid and painfulness at the points of exit of the trigeminal nerve. The velum palatinum drooped to the right, deglutition reflex wasn't aroused, the right arch was higher than the left, and the uvula was inclined to the left. Swallowing was difficult and water that was drank (based on data from laryngoscopy) remained at the level of the pyriform sinuses. On the 8th day of illness weak mobility of the right vocal cord was noted.

The patient had a disorder in external respiration (the ribs didn't take part in the act of respiration). Over a period of 14 days from the beginning of the illness, a stable bradycardia was observed; pulse was 56 - 58 beats a minute at a temperature of 37.2 - 37.3°, and 44 - 48 beats at normal temperature. There was dryness of the muccus membranes of the mouth and constant constipation. Pharyngeal reflex was lacking up to the 10th day of illness, it was necessary to feed the patient through a probe. Later he started to swallow, first liquid, then solid food. Neurological symptoms persisted in the eyes up to the 14th day of illness.

Hemogram on the 6th day of illness: l. 12000, e. 2%, p. 23%, s. 52%, limf. 18%, mon. 5% (Translator's note: The abbreviations are transliterated from the Russian.); ESR 10mm/hr. There were no peculiarities of the cerebrospinal fluid on the 6th day of illness. There were no pathological changes in the urine. Even though treatment with antitoxic antibotulism serum was started late (from the 6th day of the illness), nevertheless the administration of a sufficient dose yielded favorable results and the patient was discharged without any after-effects.

By the end of the first week of illness, a gradual reverse development of neurological symptoms began in 5 patients; in 2 patients the pathological changes of the nervous system began to disappear considerably later; in 1 case after the 17th day and in the other after the 24th day.

Dyspeptic disorders of various intensity emerged simultaneously with the neurological disorders or even somewhat before them. In the 1st or 2nd day of illness, vomiting was noted in 6 patients, dryness in the mouth - 3, abdominal pains - 3, constipation - 3, and diarrhea in 3 though it was recurrent in only one patient. Diarrhea continued for 1 or 2 days and then was replaced by persistent constipation. This last appeared in all the patients over a protracted period of time.

In the cardiovascular system there was a deadening of heart sounds registered, especially the first. Arterial pressure remained normal. The pulse as a rule didn't exceed 80 beats a minute, and in patient I., as was pointed out before, there was a sharp bradycardia. The liver and spleen were not enlarged and there were no changes in the lungs.

In 5 patients the disease proceeded with a normal temperature or with small subfebrile increases; in 3 patients a high temperature was observed for 1, 3, and 10 days.

In patient N. fever appeared up to the beginning of serotherapy and ended

a day prior to the discontinuation of treatment. It is clear that an increase of temperature couldn't be the result of a reaction to the administration of serum. N., as well as the other patients with high temperatures, didn't have any accompanying diseases that could be the source of fever. All this forms a basis for accepting the fact that the increase in temperature was caused by the botulism infection itself. Thus, a small amount of material again verifies the correctness of the observation made by N. Filatskiy and coauthors (1934) and P.F. Changli-Chaykin (1937) that botulism proceed not only with a normal, but also with a high temperature, though the latter variation is encountered less frequently.

During the period of convalescence, complications developed in the peripheral nervous system of 2 patients. In patient M., on the 17th day of illness, there was noted a decrease of muscular power and the advent of pain in the right arm, a disruption of surface sensitivity on the right po tipu polukurtki * up to a level of $D_4$, and a lowering of reflexes in the right arm. In patient I. on the 37th day of illness, a sensation of cold appeared in the right arm and in the right half of the thoracic cage. There were no disorders in the sensory and motorial sphere. Both patients were discharged from the infirmary to out-patient treatment with minor neurological symptoms.

In the literature available to us, we didn't succeed in finding any indications on the possibility of neurological complications of such a nature. Only in the article by A. N. Abramova (1937) is there a description of late (in the 3rd - 8th week of illness) complications on the part of the motorial apparatus, and even this work deals only with myositis. Apparently the complications observed by us are related to a number of uncommon manifestations of botulism. It is possible that their cause are those degenerative changes in the nerve trunks which are described by A. P. Avtsyn with coauthors.

From the laboratory investigations conducted on our patients it is necessary

to check into the results of the detection of toxin in the blood. As already mentioned, toxin could be detected in the blood of only 2 patients; in one it was isolated on the 6th day of illness and in the other in the 4th week of the disease. As was pointed out previously, this patient (I.) was admitted to the hospitol on the 22nd day of illness. Type "B" botulism toxin was isolated from a batch of blood taken on the day of admission. This was done at the laboratory of the N. F. Gamaleya Institute.

The detection of toxin during a late stage of the disease is described in literature. Kob isolated the toxin on the 9th day of the disease, Wiegeldt on the 22nd, and Semerau on the 25th (citation based on Mirtovskiy). However, similar findings are extremely scarce. Nevertheless they are very important in as much as they are weighty evidence of the toxinfectious nature of botulism and indicate the possibility of a prolonged circulation of the toxin in the blood of patients. The presence of the toxin in the blood at a late period of the disease may be explained only by the prolonged presence of active botulism microbes in the organism of the infected person, possibly in their sporogenous form with a subsequent germination into a vegetative form. Therefore the use of serotherapy is necessary even in those cases when the patients for some reason or another are hospitalized in the 2nd, 3rd, or even 4th week of the disease.

In addition to serum, four patients were given levomycetin (daily dose- 3g). The basis for this are the recommendations of many authors to use the stated antibiotic during salmonellosis which appears, just as botulism does, as a variety of food toxinfection; besides this we took into consideration the experimental data of V. N. Derkach who reported that the use of levomycetin together with antibotulism serum boosted the action of the latter. However, in the four patients observed by us there were no apparent advantages from the combined therapy. Nevertheless the combined treatment of botulism with serum and antibiotics has a pathogenic importance and merits additional development.

Three of the 8 patients under our observation were admitted to the ward with a diagnosis of poliomyelitis. The disease proceeded with expressed bulbar disorders. Such a mistake in diagnosis is fully understandable because in some forms of poliomyelitis the bulbar disorders ar the express guides in the clinical picture of the disease. However, in spit this similarity it is possible to find sufficiently s rong points for c ring out a proper differential diagnosis. As a rule, the characteristics otulism, dryness in the mouth and abundent neurological symptomatology concernir the eyes, are not encountered in poliomyelitis. On the other hand the peculiarities of poliomyelitis, the variegated paralysis or paresis of the trunk musculature and the extremities with a sharply developed hypotrophy of the muscles are lacking in botulism. In doubtful cases it is necessary to resort to an early administration of antibotulism serum in as much as it, without negatively affecting poliomyelitis patients, plays a great role in the favorable outcome of botulism.

Conclusions

1. A typical clinical picture of botulism may, in individual cases, acquire a number of peculiarities, expressed in a rather prolonged increase of temperature, the presence of diarrhea, and a late development of complications on the part of the peripheral nervous system.

2. The detection of toxin in the blood of a patient on the 22nd day of the disease substantiates the necessity of applying serum therapy on botulism patients even when admitted to the infirmary at a late date.

3. According to our data, when several persons are infected by one and the same food product, very similar clinical manifestations of botulism are observed. In group infections by various food products, there are considerable differences of the clinical pictures in the different groups.

## Literature

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* Translator's Note: po tipu polukurtki The translation for this phrase cannot be determined after using all available reference material and sources of information. Kurtka is a jacket, thus a very literal translation of the phrase could be according to the type of half-jacket or along the pattern of a half-jacket.